

Podica, hugs the banks and when surprised away from cover will "freeze motionless alongside a rock with nothing but the top of the back showing above the water". *Merganetta* never does this (as far as I know) and rather than hug the bank spends most of the day on or around some favourite stone or rock near the middle of the river or stream where the current is running strongest. For *Merganetta* two is certainly not the usual clutch (I suspect the clutch cited by Phillips was incomplete) but rather 3-5 if the eggs and broods of young so far recorded or observed are to be regarded as typical of the species.

In *Podica* the vestigial claw is used for climbing. This is not the case—at any rate I have never seen any such indication in *Merganetta*. I agree with Whiteley's and Crawford's statements that the facility with which they scramble up the slippery surfaces of water-lashed rocks or rounded stones is indeed marvellous but the wings are not used in this process and my impression (not yet proved) is that it is accomplished by a combination of the stiff tail and a vacuum-creating effect of the webbed toes.

Merganetta, as far as is known, always nests in holes and in true duck fashion buries the eggs in its own down. The nest of *Podica* is evidently completely different.

Reference:

¹ Pitman, C. R. S., 1963. *Bull. Brit. Orn. Club*, 83, (7) 127-132.

A New Zealand Scaup x Tufted Duck

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The New Zealand Scaup, *Aythya novae-seelandiae* (Gmelin) is a species found only in New Zealand, Auckland and Chatham Islands. It made its appearance in waterfowl collections in Europe and America only comparatively recently and is still far from numerous in captivity.

There are no authentic records of hybridization between this and other species of ducks either in the wild or, until recently, in captivity. The only previously published record of hybridization involving the New Zealand Scaup concerns a cross with the Pochard, *Aythya ferina* (Linn.) which is mentioned in the *Ninth Annual Report of the Wildfowl Trust*, and is repeated by Gray (1958). Mr. S. T. Johnstone of the Wildfowl Trust informs me that this record is in fact incorrect and that the parentage of the hybrid in question was *Aythya ferina* x *Aythya marila*. The Wildfowl Trust did not receive any New Zealand Scaup until 1958.

The present paper describes the previously unrecorded hybrid of New Zealand Scaup x Tufted Duck *Aythya fuligula* (Linn.). This hybrid, which was prepared as a study skin in November 1962, is an adult male in full plumage now in my collection. The bird was bred in captivity and wild hybrids of this parentage are not of course to be expected as the geographical distribution of the two species does not overlap, either during the breeding season or in the winter.

DESCRIPTION AND MEASUREMENTS

In order to facilitate easy comparison the plumage characters of the hybrid, together with those of the males of New Zealand Scaup and Tufted Duck, are given in tabular form:—

	<i>New Zealand Scaup</i>	<i>Hybrid</i>	<i>Tufted Duck</i>
Head and neck	blackish with strong purple and green iridescence; forehead steep; chin and throat dull blackish-brown.	as N.Z. Scaup; forehead almost as vertical but not quite as high; feathers of crown at rear forming a crest as in Tufted Duck.	black, glossed purplish on crown, crest, cheeks and sides of neck; but with greenish gloss evident in some lights.
Under parts	breast dark blackish-brown shading into brown and white, but more brown than white on the belly; vent blackish; sides of body and flanks from lower breast to tail-coverts rich dark chestnut.	breast blackish, shading into white with sparse brownish vermiculations; belly and vent washed brownish grey becoming blackish on tail-body and flanks grey-brown vermiculated whitish.	upper breast black; lower breast, belly, sides of body and flanks white, the latter often with faint dusky freckling; lower belly white finely vermiculated dusky; vent and under tail-coverts black.
Upper parts	uniform blackish with fine "pepper and salt" pale brownish vermiculations; rump and upper-tail coverts blackish-brown.	as N.Z. Scaup, but with purplish gloss on upper tail-coverts	black with dull greenish sheen; mantle and scapulars very finely dusted with buffish.
Wings	underwing white; wing feathers blackish with dark greenish gloss on primaries; white speculum on secondaries.	as N.Z. Scaup, but with the greenish gloss more evident.	primaries dusky brown with darker tips, and inner webs paler; inner primaries with outer webs whitish; secondaries white broadly tipped blackish, the innermost black glossed dull green.

Measurements of males in millimetres

	<i>New Zealand Scaup</i>	<i>Hybrid</i>	<i>Tufted Duck</i>
Wing	175-187*	205	198-208*
Bill	38-41*	40	38-42*
Width of bill at nostrils	20.5	23	22-24
Depth of bill at nostrils	16	20	18
Maximum width	23	23	25-25.5

* From Delacour & Scott (1959); remainder of measurements taken by the author.

The measurements of the hybrid, as can be seen from the table, are rather heterogeneous. The only really intermediate measurement is the

length of the bill from the feathers. In both wing length and the width of the bill at the nostrils the hybrid matches the Tufted Duck. It is interesting to note that the depth of the bill at the nostrils is greater than in either of the parent species, whilst the maximum width is identical to the New Zealand Scaup.

DISCUSSION

The New Zealand Scaup is clearly closely related to the Tufted Duck and the Greater Scaups, all of which are at present Holarctic in their breeding distribution. The evidence for this relationship is based primarily on morphological characters, and it would be interesting to have a detailed behavioural and ecological study of the New Zealand Scaup to provide further evidence. Certain evidence on the phylogenetical relationships of *Aythya* species has been discussed previously by Harrison & Harrison (1960a & b, 1961, 1962) and Sage (1955, 1962). It is interesting to note that in the hybrid a number of Tufted Duck characters have gained expression, and overall the morphology is closer to this species than to the New Zealand Scaup.

It is interesting to theorise on the origin of the New Zealand Scaup. There is a certain amount of fossil evidence which allows an approximate date for the origin of *Aythya* as a genus to be given. The indications are that Anseriformes had its origin and early development on the continent of Europe and began to spread elsewhere about the middle of the Tertiary Period, about 25,000,000 years ago in the Miocene. Howard (1950) states that true ducks and swans of modern subfamilies first appeared in the Oligocene of Europe, *i.e.* about 40,000,000 years ago, and that some of the former have been referred to the genus *Aythya*. The fact that many of the modern species of this genus had evolved by the Pleistocene is proved by the existence of fossil remains of the Redhead *Aythya americana* (Eyton), Canvas-back *Aythya valisineria* (Wilson), and Lesser Scaup *Aythya affinis* (Eyton) in Pleistocene strata in North America. It is interesting to note that the Ring-necked Duck *Aythya collaris* (Donovan), a species that is also closely related to the Tufted Duck and Scaups and whose present range is largely sympatric with that of the Lesser Scaup, is represented by fossil remains in the Lower Pliocene of Nevada. It seems reasonable, therefore, to postulate that the Ring-necked or Collared Duck is of greater antiquity than the Lesser Scaup, and that its early ancestor reached North America from Eurasia at an early stage and developed specifically before the onset of the ice age.

The means by which the New Zealand Scaup or the ancestor thereof reached New Zealand, and when it did so, are matters for speculation. Two possible solutions are available, namely direct immigration from the northern hemisphere, or colonisation via Australia. According to Fleming (1962) five of the endemic New Zealand species of overseas genera are possibly of Holarctic (north temperate) origin, and in this category are included the New Zealand Scaup and the now extinct Auckland Island Merganser *Mergus australis* Hombron and Jacquinot. There is no doubt at all that a considerable percentage of the New Zealand avifauna is derived from Australia. The New Zealand Brown Teal *Anas aucklandia chlorotis* Gray for example is clearly related to the Chestnut Teal *Anas castanea* (Eyton) of Australia. Examples of recent colonisations from this

source are the Grey Teal *Anas gibberifrons gracilis* Buller which arrived in the last century, and the Australian White-eye *Aythya australis australis* (Eyton) which arrived at the same period but failed to persist. The New Zealand Scaup is now a long way removed geographically from its nearest relatives, and the fact that there is no close relative in Australia or the intervening tropics does not necessarily mean that one did not exist in those regions in the past. There are precedents for this in other faunal groups: three frogs of the family Leiopelmididae are at present found in New Zealand but the family no longer exists in Australia or the Orient as it did in the past, but is represented in North America. For an explanation of this phenomenon one has only to look to the climatic changes that occurred in the Pleistocene and later. Australia is currently in an arid phase which, the evidence suggests, commenced with marked aridity in the early Recent. There is ample fossil evidence of a quite diverse aquatic fauna which existed in Australia prior to this phase. Similar remarks apply also to New Zealand where the fossil record contains enough evidence to justify the theory that there existed a period in which waterfowl and grassland birds flourished and then died out, probably as a result of drought conditions (see Falla 1953). In view of the very distinct specific status of the New Zealand Scaup it seems probable that it reached New Zealand quite early, possibly the early Pleistocene or even considerably before, and survived the glacial and subsequent climatic fluctuations in suitable refuges. If this is in fact the case, then the evolutionary history of the New Zealand Scaup and the Ring-necked Duck seem to have much in common, for the latter must also have survived the glaciation of North America. Possibly both species reached their present geographical areas in the early phases of dispersal from continental Europe in the Tertiary.

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